

REMARKS

Initially, applicant wishes to thank the Examiner for his time in conducting the telephonic interview with applicant's attorney on September 17, 2004.

Claims 11-21 and 36-44 are pending in the application. Favorable reconsideration and allowance of this application is respectfully requested in light of the remarks that follow.

1. Objection To Oath/Declaration

In the Office Action, the Examiner has indicated that the Declaration was not signed by the inventor.

Upon review of applicant's file for this application, in a Response to a Notice to File Missing Parts dated May 18, 2001, applicant filed a signed Declaration, copy enclosed. Therefore, applicant respectfully requests that the Examiner withdraw the objection to the Declaration, as a signed Declaration was filed previously with regard to this application.

2. Priority Claim

In the Office Action, the Examiner acknowledged the priority claim made based on the patent applications filed in the United Kingdom on January 25, 2000 and July 12, 2000. However, certified copies of these patent applications have not been filed as required under 35 U.S.C. Section 119(b).

With this response, applicant hereby submits certified copies of each of United Kingdom Patent Application Serial No. 0001699.8 and United Kingdom Patent Application Serial No. 0017188.4 in satisfaction of the requirement under 35 U.S.C. Section 119(b).

3. Rejection Under 35 U.S.C. Section 103(a)

The rejection of claims 11-21 and 36-44 under 35 U.S.C. Section 103(a) as being unpatentable over Zanma et al. U.S. Patent No. 4,714,592 (the '592 patent), or Mehta et al. U.S. Patent No. 3,663,179 (the '179 patent) or Fuchs U.S. Patent No. 3,941,869 (the '869 patent), or European Patent No. 0 484 534 (the '534 patent), in view of D. Reay, "Learning From Experiences With Compact Heat Exchangers (the Reay reference) is respectfully traversed, because, *inter alia*, there is no teaching or suggestion to combine or modify references to produce the claimed invention. Furthermore, even if the references were combined, the claimed invention would not result.

Claim 11 requires a reactor including an outer wall, a plurality of heat exchanger panels arranged within the outer wall at an angle thereto, a plurality of reaction zones separated by the heat exchanger panels, but in fluid communication with one another through the heat exchanger panels, and a number of baffles located within each reaction zone to define boundaries for the reaction zones. Further, each of the heat exchanger panels is formed of a printed circuit heat exchange (PCHE) plate or plates.

In contrast, the '592 patent discloses a radial flow catalytic reactor 1 in which the reactor 1 is divided into four separate reaction zones by partition walls 37a-37d positioned in the reactor at 90 degrees with respect to one another. However, each of the partition walls 37a-37d, while separating the reaction zones from one another, are formed simply as a solid wall that prevents all reactant and heat transfer fluid flow from one zone to another. This is in direct contrast to the heat exchanger panels separating the reaction zones required by claim 11 that enable both reactant and heat transfer fluid flow between the reaction zones, which is not shown or suggested by the '592 patent. Additionally, the heat exchanger 4 that is present within the '592 patent

reactor 1 construction is disposed centrally within the catalyst bed along a vertical axis of the reactor 1, and not disposed at an angle with respect to the reactor outer wall and separating the reaction zones as required by claim 11.

The '179 patent discloses an apparatus for exothermic catalytic reactions in which a catalyst basket 7 supports an amount of catalyst to form a catalyst bed 14 within which is disposed a plurality of horizontal, perforated circular pipes 17 arranged on two levels concentrically about a central axis of the catalyst bed 14. The pipes 17 are fed a cold quench fluid for dispersal from the pipes 17 directly into the catalyst bed 14 to control the temperature of the bed. Thus, because the pipes 17 are simply disposed within the catalyst bed 14 in the basket 7 and do not separate the catalyst bed 14 into a plurality of reaction zones, the pipes do not constitute the heat exchanger panels arranged within the outer wall at an angle thereto that separate the reaction zones from one another as required by claim 11. Also, as the apparatus disclosed in the '179 patent does not include any separated reaction zones, the apparatus also does not include or suggest any baffles defining boundaries for each reaction zone as required by claim 11.

The '869 patent discloses a process for exothermic reactions in which a portion 2 of an incoming stream 1 of a cold feed reactant fluid is directed through a tubular central element 5 to mix with an amount of hot reacted fluid within an aspirator element 7 to preheat the incoming fluid. The preheated fluid stream is then mixed with the remaining portion 3 of the cold feed reactant fluid and subsequently passes through a catalytic bed defined by foraminous grid or plate elements 11 and 12, where the fluids react with the catalyst. The hot reacted fluid is then divided such that a portion of the hot fluid is diverted out of the reactor through a pipe 15, while the remaining portion, as discussed previously, is mixed with the portion of the incoming cold

feed reactant in the central element 5 to continually preheat the incoming cold feed reactant fluid.

Nowhere in the '869 patent is a reactor disclosed or suggested which has either a plurality of reaction zones formed by heat exchanger (PCHE) panels arranged within the reactor at an angle with respect to an outer wall or with baffles disposed along each reaction zone to form boundaries for the reaction zones as required by claim 11.

The '534 patent discloses a reactor 56 having a catalyst bed defined by walls 61, 62, 65 and 66 and including a number of spirally oriented members 70 positioned therein. Each member 70 includes vertical passages 74 joined at each end by generally horizontal passages 78 through which a heat transfer fluid flows to cool the catalyst bed. The passages 74 in these members 70 are joined to one another by solid walls 75 such that the catalyst in the bed is not disposed between the passages 74. Thus, the '534 patent discloses only a reactor having a catalyst bed in which is disposed a number of vertical heat exchange fluid passages positioned in a spiral configuration between the center of the reactor and an outer wall of the reactor. In this construction, the heat transfer through the catalyst bed is very poor, which is one of the problems specifically addressed and overcome by the reactor recited in claim 11. Therefore, the '534 patent does not disclose or suggest a reactor in which the reaction zones are separated by heat exchanger panels that allow fluid communication between the reaction zones on each side of the panels, as the members 70 form a solid wall that does not permit fluid flow through the members 70 due to the passages 74 and the walls 75 extending therebetween. Further, the '534 patent does not show or suggest reaction zones in which each reaction zone is bounded by baffles extending between the heat exchanger panels to isolate the reaction zones from one another as required by claim 11 because the separate zones are only separated by the members 70.

In short, each of the '592 patent, '179 patent, '869 patent and '534 patent fail to show or suggest each of the elements of claim 11. The Reay reference is unable to cure this deficiency. More specifically, the Reay reference discloses only very generally certain design features and capabilities of printed circuit heat exchangers (PCHE) without any disclosure or suggestion whatsoever of the use of these types of exchangers within reactors having separated reaction zones. Thus, there is no motivation in the Reay reference to utilize a PCHE in any of the reactors shown in the other cited references. Further, even if the PCHE was included in any of these references, these combinations do not suggest both the use of the PCHE panels as the angularly oriented heat exchangers to define the reaction zones, and the baffles bounding the reaction zones as required by claim 11. Therefore, all of the prior art references, either alone or in combination with one another, fail to show or suggest each of the elements of claim 11.

Further, each of claims 12-21 and 36-44 depends from claim 11 and therefore includes all of the elements of claim 11. Thus, dependent claims 12-21 and 36-44 are believed to be in condition for allowance for incorporating by reference the limitations of claim 11 and for defining additional features of the invention, which, when considered in combination with those of claim 11, are not shown or suggested by the prior art relied upon in the rejections.

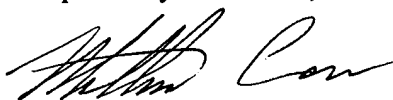
CONCLUSION

It is submitted that claims 11-21 and 36-44 are in compliance with 35 U.S.C. Section 103 in each defined patentable subject matter. A Notice of Allowance is therefore respectfully requested.

A check in the amount of \$110.00 is submitted with this response to cover the required fee for a 1-month extension of time to respond to the Office Action. No other fees are believed to be payable with this communication. Nevertheless, should the Examiner consider any other fees to be payable in conjunction with this or any future communication, the Director is authorized to direct payment of such fees, or credit any overpayment to Deposit Account No. 50-1170.

In view of the forgoing amendments and remarks, the application is believed to be in *prima facie* condition for allowance, and such action is earnestly requested. The Examiner is invited to contact the undersigned by telephone if it would help expedite the prosecution and allowance of this application.

Respectfully submitted,



Mathew E. Corr

Registration No. 45,434

Dated: 9/21/04

BOYLE FREDRICKSON NEWHOLM STEIN & GRATZ, S.C.
250 E. Wisconsin Ave., Ste. 1030
Milwaukee, WI 53202
Telephone: (414) 225-9755
Facsimile: (414) 225-9753
Customer No. 23598

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Director of the U.S. Patent & Trademark Office, Washington, DC 20231 on the date indicated below.

Jodi A. Calderon
Jodi A. Calderon

Date: 5/18/01

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.: 09/769,561

Filing Date: January 25, 2001

Inventor: Johnston

Assignee: Meggitt (UK) Limited

Invention: *Compact Reactor*



Examiner: (not yet assigned)

Group Art Unit: 1764

Attorney Docket No. 101.002

RESPONSE TO NOTICE TO FILE MISSING PARTS OF APPLICATION

Assistant Commissioner for Patents
Box Missing Parts
Washington, D.C. 20231

Sir:

In response to the Notice to File Missing Parts of Nonprovisional Application, Filing Date Granted, mailed March 8, 2001 in the above-captioned application, applicant submits the following:


- 1) Notice to File Missing Parts of Nonprovisional Application filed under 37 CFR 1.53(b), Filing Date Granted.
- 2) Executed 1-page Declaration.
- 3) Executed Assignment document, Recordation Form Cover Sheet.
- 4) Preliminary Amendment.
- 5) Request for Corrected Filing Receipt.
- 6) Information Disclosure Statement with PTO-1449 reference listing.

U.S. Serial No. 09/769,561 to Johnston
Art Unit: 1764
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- 7) A check in the amount of \$450.00 which includes: 1) late filing of applicant's Declaration (\$130.00), 2) a request for a one-month extension of time (\$110), 3) the submission of five additional claims in excess of twenty (\$90), 4) the submission of one additional independent claim in excess of three (\$80) by a large entity, and 5) payment of the assignment recordation fee (\$40). A Fee Transmittal Form PTO/SB/17 (11/00) is also enclosed.

The Director is hereby authorized to charge payment of any extension or additional fees associated with this or any other communication or credit any overpayment to Deposit Account No. 50-1170.

Respectfully submitted,


Timothy E. Newholm
Registration No. 34,400

Dated: May 18, 2001

BOYLE, FREDRICKSON, NEWHOLM,
STEIN & GRATZ, S.C.
250 Plaza, Suite 1030
250 East Wisconsin Avenue
Milwaukee, WI 53202
Telephone: (414) 225-9755
Facsimile: (414) 225-9753